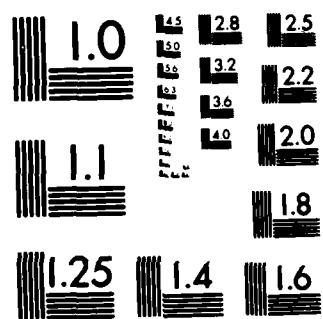


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UNIV MA CENTER FOR ATMOSPHERIC RESEARCH H E MOSES  
OCT 82 AFOSR-TR-83-1275 AFOSR-81-0253

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## REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b. RESTRICTIVE MARKINGS													
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.													
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE															
4. PERFORMING ORGANIZATION REPORT NUMBER(S)		5. MONITORING ORGANIZATION REPORT NUMBER(S) <b>AFOSR-TR-83-1275</b>													
6a. NAME OF PERFORMING ORGANIZATION University of Lowell	6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION Air Force Office of Scientific Research													
6c. ADDRESS (City, State and ZIP Code) Center for Atmospheric Research 450 Aiken Street Lowell MA 01854		7b. ADDRESS (City, State and ZIP Code) Directorate of Mathematical & Information Sciences, Bolling AFB DC 20332													
8a. NAME OF FUNDING/SPONSORING ORGANIZATION AFOSR	8b. OFFICE SYMBOL (If applicable) NM	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER AFOSR-81-0253													
8c. ADDRESS (City, State and ZIP Code) Bolling AFB DC 20332		10. SOURCE OF FUNDING NOS. <table border="1"><tr><td>PROGRAM ELEMENT NO. 61102F</td><td>PROJECT NO. 2304</td><td>TASK NO. A4</td><td>WORK UNIT NO.</td></tr></table>		PROGRAM ELEMENT NO. 61102F	PROJECT NO. 2304	TASK NO. A4	WORK UNIT NO.								
PROGRAM ELEMENT NO. 61102F	PROJECT NO. 2304	TASK NO. A4	WORK UNIT NO.												
11. TITLE (Include Security Classification) RESEARCH ON THE INVERSE PROBLEM OF SCATTERING		14. DATE OF REPORT (Yr., Mo., Day) OCT 82													
12. PERSONAL AUTHOR(S) Harry E. Moses		15. PAGE COUNT 7													
13a. TYPE OF REPORT Interim		13b. TIME COVERED FROM 1/10/81 TO 30/9/82	14. DATE OF REPORT (Yr., Mo., Day) OCT 82												
16. SUPPLEMENTARY NOTATION															
17. COSATI CODES <table border="1"><tr><th>FIELD</th><th>GROUP</th><th>SUB GR.</th></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>		FIELD	GROUP	SUB GR.										18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number) Inverse scattering; acoustic equation; soliton theory.	
FIELD	GROUP	SUB GR.													
19. ABSTRACT (Continue on reverse if necessary and identify by block numbers) The activities done under the grant for the fiscal year 1982 are summarized. Primary emphasis has been the expansion of the applications of the Gelfand-Levitan formalism to provide examples of potentials for which the Schrödinger equation has unusual spectral properties and thereby generalize the kinds of spectral representation which one can have. The investigators have been partially successful in considering a case in which the potential is associated with a non-analytic reflection coefficient and a case in which the impulse response is a square pulse. The latter case may be of interest in providing passive means of convoluting a signal with a square pulse. Research directions which have led to publications are given by the papers which have been published, listed in the report.															
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED UNLIMITED <input checked="" type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS <input type="checkbox"/>		21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED													
22a. NAME OF RESPONSIBLE INDIVIDUAL Dr. Robert N. Bushal		22b. TELEPHONE NUMBER (Include Area Code) (011) 767-4939	22c. OFFICE SYMBOL NM												

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**RESEARCH ON THE INVERSE PROBLEM OF SCATTERING**

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October 1982

Yearly Report on Grant AFOSR-81-0253  
1 October 1981 - 30 September 1982

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## 1.0 RESEARCH DIRECTIONS

The principal direction of our research in the year 1 October 1981 - 30 September 1982 has been the expansion of the applications of the Gelfand-Levitan formalism to provide examples of potentials for which the Schrödinger equation has unusual spectral properties and thereby generalize the kinds of spectral representations which one can have. We have been partially successful in considering a case in which the potential is associated with a non-analytic reflection coefficient and a case in which the impulse response is a square pulse. The latter case may be of interest in providing passive means of convoluting a signal with a square pulse. Research directions which have led to publications are given by the papers which have been published, which are listed below. Some were accepted in the present fiscal year and were published in 1983. The list of the latter publications is included in the bibliography in the yearly report for 1 October 1982 - 30 September 1983.

## 2.0 INTERACTIONS WITH OTHER SCIENTISTS

The author continued to work with Dr. P. B. Abraham, now of the Naval Research Laboratory, Prof. J. M. Cohen of the University of Pennsylvania, and Prof. R. T. Prosser of Dartmouth College. He continued to attend, organize and speak at a seminar at Massachusetts Institute of Technology.

### 3.0 PUBLICATIONS

1. "An Explicit Example of a Local and a Non-Local Potential Whose Hamiltonians are Unitarily Equivalent and Whose Scattering Operators are Identical" (with P. B. Abraham and B. DeFacio), *Studies in App. Math.*, 66, 45 (1982).
2. "Exact Solutions of the One-Dimensional Acoustic Wave Equation for Several New Velocity Profiles. Transmission and Reflection Coefficient" (with P. B. Abraham), *J. Acous. Soc.*, 71, 1391 (1982).